All-in-One USB PD and Bidirectional PWM Buck-Boost Controller

1 General Description

The RT7885 is a USB Power Delivery (USB PD) controller that adopts a Buck-Boost PWM control scheme, integrating functions specifically for USB power bank applications. This controller is designed to operate in peak current mode with programmable current limit and switching frequency.
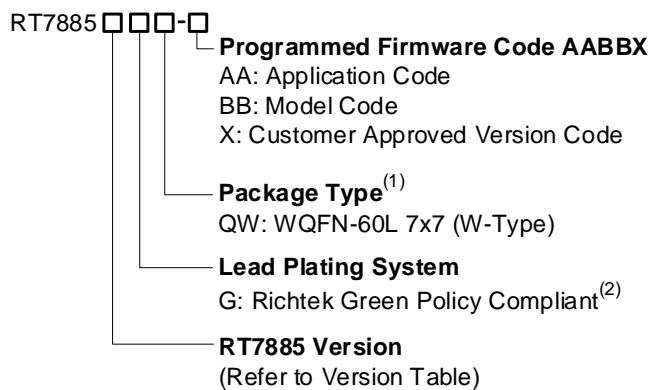
The RT7885 embeds an ARM Cortex^{TM}-M0 MCU to facilitate various functions, including communication protocols, protections, and customized requirements. Additionally, the RT7885 features built-in charge pumps for driving low-cost NMOS to control the power path. Consequently, this IC provides an optimal USB PD solution for power bank applications with a minimal count of external components.

The recommended junction temperature range is −40°C to 125°C, and the ambient temperature range is −40°C to 85°C.

2 Applications
- USB PD Type-C Power Banks

3 Ordering Information

RT7885□□□-□

Programmed Firmware Code AABBX
AA: Application Code
BB: Model Code
X: Customer Approved Version Code

Package Type[1]
QW: WQFN-60L 7x7 (W-Type)

Lead Plating System
G: Richtek Green Policy Compliant[2]

RT7885 Version
(Refer to Version Table)

Note 1.

- Marked with [1] indicated: Compatible with the current requirements of IPC/JEDEC J-STD-020.
- Marked with [2] indicated: Richtek products are Richtek Green Policy compliant.

4 Features

- **Communication Protocols**
  - **Support Type-C and USB Power Delivery (PD) Communication**
  - **Support Dual-Role Power (DRP) Application**
  - **Support Proprietary Protocols via DP and DM Interfaces**
- **Charging Operation for 2S to 4S Battery**
  - **CC and CV Charge, End of Charge, Re-Charge, and Charging Timeout Protection**
  - **Cell Balance Control**
- **Bidirectional Buck-or-Boost Operation:**
  - **Peak-Current Mode PWM Operation**
  - **Programmable PWM Switching Frequency**
  - **Programmable Constant Voltage and Constant Current Settings for Charger/Provider Mode Output**
  - **Pulse-Skipping Mode (PSM) for Light-Load Efficiency**
  - **Programmable Cable Voltage Drop Compensation**
- **2 Charge Pump Gate Drivers for N-MOSFETs**
- **Hardware and Firmware-Based Protections:**
  - **Adjustable Converter Input Current-Limit**
  - **Programmable Overvoltage Protections (OVP) and Undervoltage Protections (UVP)**
  - **Adjustable External OTP**
- **Master/Slave I^{2}C Interface, LED Drivers, GPIOs**
- **Built-in Bleeders for Quick VBUS Discharge**
- **Online Firmware Update via CC1/2 or Slave I^{2}C Interfaces**
- **WQFN-60L 7x7 Package**
- **USB PD PD3.0/PPS Certification Passed (TID 2319)**